Panels (P)
Scientific Ballooning: Recent Developments in Technology and Instrumentation (PSB.1)

LEADING UNIVERSITY STUDENTS TO THE EDGE OF SPACE

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For over 16 years, the Louisiana Space Grant Consortium (LaSPACE), the NASA Balloon Program Office (BPO), and the NASA Columbia Scientific Balloon Facility (CSBF) have collaborated in a series of high altitude balloon-based programs involving hands-on authentic learning experiences that expose university students and other participants to technical skills, teamwork dynamics, and effective communication methods. Such programs go beyond what is possible to achieve in a normal classroom and help prepare future engineers and scientists for a successful aerospace workforce career. In our collaborative effort, LaSPACE has focused on the program content and student mentoring while NASA BPO and CSBF provide balloon flight support and operations. The entry-level Louisiana Aerospace Catalyst Experiences for Students (LaACES) builds students' skills in basic electronics, sensor interfacing, real-time programming, mechanical development, and project management. These skills are then applied to the design, development, fabrication, and flight of a small (∼500 gram) balloon payload. Finally, the payloads are flight-tested to an altitude of ∼30 km using a 2 kg latex sounding balloon. The LaACES program includes a set of lectures, activities, and Arduino Mega based electronic kits that are used for skill building and as a core control system for the student payload. The more advanced High Altitude Student Platform (HASP) is designed to carry ∼twelve 3 to 20 kg student payloads to an altitude of about 36 kilometers with flight durations of 10 to 20 hours using a ∼311,500 cubic meter, zero pressure balloon. HASP provides all student payloads with power, downlink telemetry, uplink commanding, and real-time HD video for instrument control and assessment during the flight. While originally developed for university students, these programs have been adapted to projects focused on high school teachers as well

as affecting minorities underrepresented in aerospace related science and engineering fields. We are now in the process of adapting the LaACES materials to a pre-engineering curriculum for high school students as well as for widespread access over the internet. During this presentation, we will provide details of both the LaACES and HASP programs, how these programs have engaged participants from all demographic groups, and our current plans for continuing and expanding upon our success.